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A Descriptive List of Staten Island Diatoms.*

BY E. A. SCHULTZE.

Plate LXIX.

NAVICULA VIRIDIS, Kütz.

Navicula viridis, Van H., Syn. Diat. Bel., pl. V., fig, 5; Sm., Syn., p. 54, pl. XVIII., fig. 163; Kütz., Bacill., p. 97, t. IV., fig. 18, t. XXX., fig. 12; Schum., Diat. d. H. Tatra, p. 71, t. III., fig. 47; O'Meara, Rep. on th Irish Diat., p. 341, pl. XXX., fig. 3; Ralfs in Prit. Infus., p. 907, pl. IX., figs. 135, 136; Rab. Süss. Diat., p, 42, t. VI., fig. 4; Brun. Diat., p. 83, pl. VIII., fig. 5.

Navicula viridula, Kütz., Bacill., XXX., 47; Cl. and Gr., Arct. Diat., p. 33, t. II., fig. 35; Van H., pl. VII., fig. 25.

Pinnularia viridula, W. Sm., Syn., Vol. I., p. 57, pl. XVIII., fig. 175.

Bacillaria viridis, Nitsch, t. VI., figs. 1–3.

Pinnularia viridis, W. Sm.

Valve elliptical linear, with rounded apices; costæ parallel, broad, slightly radiant, shorter opposite the central nodule; a longitudinal, free, median space.

Hab.—Fresh water, frequent. Clifton, New Brighton, New Dorp. (Plate LXIX., fig. 1.)

This species has been attributed to various authors, but if Kützing be right in supposing it to be the *Bacillaria viridis*, Nitsch, 1817, it should be attributed to the last named author, as Heiberg has done. Smith assigns the species to himself, although regarding it as = *Navicula viridis*, Ehr. Rabenhorst attributes it to himself, while Grunow attributes it to Kützing. Grunow makes this form the type of the group Virides, but seems to regard *Navicula major*, which he includes among the Nobiles, to be only a variety of *Navicula viridis*. Speaking of this former he says: "It appears to me to be only a variety of *Nav. viridis*; tolerably numerous figures which lie before me

* Continued from page 73.

present such manifold transitions, as well in respect to the appearance of the striation as to the outline of the form, that in most cases it is difficult to decide whether the specimen should be referred to one or the other." The correctness of this remark is obvious to all careful observers, but still the species seem to be distinct.

The following characters seem to distinguish *Navicula viridis* from *N. major :* The costæ are finer and less radiate ; the median free space is narrower and less expanded around the central nodule, and the normal outline is linear-elliptical.—*O'Meara.*

NAVICULA PUSILLA, W. Sm.

Navicula pusilla, Sm., Syn., Vol. i., p. 52, pl. XVII., fig. 145; Ralfs in Prit. Infus., p. 900; Donkin, Brit. Diats., p. 20, pl. III., figs. 6a and 6b.; Brun., p. 75, pl. VII., fig. 36b; Van Heurck, Syn. Diat. Belg., pl. XI., fig. 17; O'Meara, Rep. on the Irish Diat., p. 381, pl. 32, fig. 14; Rabenh., E. Diat., p. 193.

Navicula gastroides, Greg.

Navicula tumida, var. *subsalsa*, Grunow.

Valve small, broadly oval with produced short truncate ends ; striæ distinct, moniliform and reaching to the median line, convergent opposite the central nodule and radiate towards the apices.

Hab.—Brackish water, scarce. Salt Meadows at New Dorp. (Plate LXIX., fig. 2.)

Prof. Gregory distinguished his *Navicula gastroides* from this species by its stouter habit and larger size ; but we unite them, as Prof. Smith has done, being unwilling to add another doubtful species to this group, which we believe is already too numerous.—*Ralfs.*

NAVICULA OBLONGA, Kütz.

Navicula oblonga, Kütz., Bacill., p. 97, t. IV., fig. 21; Ralfs in Prit. Infus., p. 907; O'Meara, Rep. on the Irish Diat., p. 344, pl. 30, fig. 10; Van Heurck, Syn. Diat. Belg., pl. VII., fig. 1.

Pinnularia oblonga, Brun., p. 82, pl. VIII., fig. 3; Sm., Syn., Vol. i., p. 55, pl. XVIII., fig. 165; Rabenh., Süssw. Diat., p. 45, t. VI., fig. 6.

Navicula macilenta, Ehr., Infus., 1838, t. XXI., fig. 13.

Pinnularia macilenta, Ehr., 1844.

Pinnularia polyptera, Ehr. 1844.

Valve elliptical linear, with broad, rounded extremities, costæ stout, convergent at the centre, and radiate towards the ends ; intermediate free space narrow, but roundly expanded at central nodule.

Hab.—Fresh water; New Brighton, Clifton, New Dorp, frequent. (Plate LXIX., fig. 3.)

We follow Kützing and Smith in referring *P. macilenta*, Ehr., to this species. Ehrenberg's figures, however, differ from theirs in being more linear, with less tapering apices.—*Ralfs.*

The form described by Rabenhorst, Süss. Diat., p. 45, t. VI., fig. 6, as *Pinnularia oblonga*, is obviously different from the present species.—*O'Meara.*

NAVICULA MESOTYLA, Ehr.

Navicula mesotyla, Kütz., Bacill., p. 99, t. V., fig. 3, t. XXVIII, fig. 84; Ralfs in Prit. Infus., p. 895; Schumann, Diat. der Hohen Tatra, p. 77, pl. IV., fig. 51.

Valve with triundulating margins terminating in obtuse rounded apices; striæ slightly connivent; longitudinal free median space broader at the nodules and between the outward bulging undulations.

Hab.—Fresh water; New Dorp, rare. (Plate LXIX., fig. 4.)

NAVICULA MESOLEPTA, Ehr.

Navicula mesolepta, Kütz., Bacill., p. 101, t. XXVIII., fig. 73, t. XXX., fig. 34; Ralfs in Prit. Infus., p. 894; Van Heurck, Syn. Diat. Belg., pl. VI., figs. 10, 11.

Pinnularia mesolepta, Sm., Syn., Vol. i., p. 58, pl. XIX., fig. 182.

Valve elongated linear; margins triundulating, forming three equal central inflations, and terminating in broad, rounded extremities; costæ reaching to the median line.

Hab.—Fresh water, scarce. New Dorp. (Plate LXIX., fig. 5.)

NAVICULA RHOMBOIDES, Ehr.

Navicula rhomboides, Kütz., Bacill., p. 94, t. XXVIII., fig. 45, t. XXX., fig. 44; Rabenh., Süssw. Diat., p. 38, t. V., fig. 13; Sm., Syn., Vol. i., p. 46, pl. XVI., fig. 129, and Vol. ii., p. 90; Ralfs in Prit. Infus., p. 903; Donkin, Brit. Diat., p. 42, pl. VI., fig. 11; Brun, Diat. Alpes and Jura, p. 64, pl. VII., fig. 3f; Van Heurck Syn. Diat. Belg., pl. XVII., fig. 1; O'Meara, Rep. on the Irish Diat., p. 374, pl. XXXI., fig. 49; Schumann, Diat. der Hohen Tatra, p. 68.

Valve rhomboid-lanceolate; extremities slightly rounded; striæ exceedingly fine and parallel; central nodule but little developed, and hardly visible between two longitudinally juxtaposited cones formed by two median lines convergent toward the end nodules.

Hab.—Fresh water, frequent. (Plate LXIX., fig. 6.)

NAVICULA INFLATA, Kütz.

Navicula inflata, Kütz., Bacill., p. 99, t. III., fig. XXXVI., 1, 2, 3; Sm., Syn., Vol. i., p. 50, pl. XVII., fig. 158; Donkin, Brit. Diat., p. 21, pl. III., fig. 9; Ralfs in Prit. Infus., p. 899 ; Brun, Diat. Alpes and Jura, p. 76, pl. VII., fig. 15; O'Meara, Rep. on the Irish Diat., p. 413, pl. XXXIV., fig. 23.

Pinnularia inflata, Rabenh., Sussw. Diat., p. 44, t. V., fig. 10 c.

Navicula follis, Ehr.

Valve small, elliptical, with obtuse truncated extremities and inflated centre ; striæ moniliform, radiate, reaching to the median line.

Hab.—Fresh water, occasional; New Dorp. (Plate LXIX., fig. 7.)

NAVICULA LATISSIMA, Greg.

Navicula latissima, Donkin, Brit. Diat., p. 17, pl. III., fig. 2; Ralfs in Prit. Infus., p. 903; O'Meara, Rep. on the Irish Diat., p. 379, pl. XXXII., fig. 6.

Pinnularia divaricata, O'Meara, Q. Mic. Jour., n. s., Vol. VII., p. 116, pl. V., fig. 7.

Valve broadly elliptical, extremities slightly produced; intermediate free space expanded around the central nodule; striæ distinctly moniliform, convergent opposite the central nodule, and radiate towards the ends.

Hab.—Marine, not abundant. South Beach, in deep water. (Plate LXIX., fig. 8.)

NAVICULA SPHÆROPHORA, Kütz.

Navicula sphærophora, Kütz., Bacill., p. 95, t. IV., fig. 17; Sm., Syn., Vol. 1, p. 52, pl. XVII., fig. 148; Rabenh., Sussw. Diat., p. 40, t. VI., fig. 65a; Ralfs in Prit. Infus., p. 899; Donkin, Brit. Diat., p. 34, pl. V., fig. 10; Van Heurck, Syn. Diat. Belg., pl. XII., fig. 2; O'Meara, Rep. on the Irish Diat., p. 360, pl. XXXI., fig. 11; Brun, Diat. Alpes and Jura, p. 67, pl. VII., fig. 16.

Valve elliptical, constricted into produced capitate apices ; striæ punctate and slightly convergent, not reaching the median line.

Hab.—Fresh water, not frequent. Clifton. (Plate LXIX., fig. 9.)

NAVICULA PUNCTATA, Kütz.

Navicula punctata, Donkin, Brit. Diat., p. 36, pl. V., fig. 12; O'Meara, Rep. on the Irish Diat., p. 380, pl. XXXII., fig. 10.

Stauroneis punctata, Kütz., Bacill., p. 106, t. XXI., fig. 9; Sm., Syn., Vol. i., p. 61, pl. XIX., fig. 189; Ralfs in Prit. Infus., p. 912; Van Heurck, Syn. Diat. Belg., pl. X., fig. 14; Brun., Diat. Alpes and Jura, p. 90, pl. IX., fig. 4.

Stauroptera punctata, Rabenh., Sussw. Diat., p. 50, t. IX., fig. 11.

Valve elliptical, extremities capitate, narrow ; striæ punc-

tate, radiate and interrupted at the central nodule by a stauroneiform blank space not reaching the margin of the valve.

Hab.—Fresh water. In streams, Clifton, frequent though not abundant. (Plate LXIX., fig. 10.)

This species has been placed in the genus *Stauroneis* by Kützing, on account of the peculiar shortening of the striæ opposite the central nodule; it is, however, a genuine *Navicula.*—*Donkin.*

NAVICULA LONGA, Greg.

Navicula longa, Ralfs in Prit. Infus., p. 906; Donkin, Brit. Diat., p. 55, pl. VIII., figs. 3a and 3b; O'Meara, Rep. on Irish Diat., p. 344, 345, pl. 30, fig. 11.

Valve lanceolate, narrow; costæ stout, radiate, shorter opposite the central nodule.

Hab.—Marine. South Beach on submerged timber. (Plate LXIX., fig. 11.)

NAVICULA RECTANGULATA, Greg.

Navicula rectangulata, Greg., Diat. of the Clyde, p. 7, pl. I., fig. 7; Ralfs in Prit. Infus., p. 907; Donkin, Brit. Diat., p. 66, pl. X., fig. 5; O'Meara, Rep. on Irish Diat., p. 343, pl. 30, fig. 8.

Pinnularia rectangulata, Rabenh., p. 215.

Valve linear, with broadly rounded ends, bulging at the middle; intermediate free space narrow, but roundly inflated in the middle; costæ stout, converging opposite the inflated space and radiate towards the extremities.

Hab.—Marine. South Beach. (Plate LXIX., fig. 12.)

NAVICULA MAJOR, Kutz.

Navicula major, Kutz., Bacill., p. 97, t. IV., figs. 19 and 20; Ralfs in Prit. Infus., p. 896, pl. VII., fig. 65; Donkin, Brit. Diat., p. 69, pl. XI., figs. 2a and 2b; Van Heurck, Syn. Diat. Belg., pl. V., figs. 3 and 4; Schum., Diat. der Hohen Tatra, p. 70.

Pinnularia major, Rabenh., Sussw. Diat., p. 42, t. VI., fig. 5; Sm., Syn., Vol. i., p. 54, pl. XVIII., fig. 162; Brun., Diat. Alpes and Jura, p. 84, pl. VIII., fig. 1.

Valve broad, linear, distended in the middle and at the rounded extremities; intermediate free space broad; central nodule large and round; costæ stout, convergent opposite central nodule and slightly radiate towards the extremities.

Hab.—Fresh water, frequent. (Plate LXIX., fig. 13.)

This species scarcely differs from *N. nobilis* and *N. gigas*, except by its somewhat smaller size and closer pinnules.—*Ralfs.*

NAVICULA LIMOSA, Kütz.

Navicula limosa, Kutz., Bacill., p. 101, t. III., fig. 50; Rabenh., Sussw. Diat.,

p. 41, t. VI., fig. 31; Ralfs in Prit. Infus., p. 894; Donkin, Brit. Diat., p. 73, pl. XII., figs. 6a and 6b; Brun, Diat. Alpes and Jura, p. 73, pl. VII., fig. 12; O'Meara, Rep. on the Irish Diat., p. 368, pl. 31, fig. 30; Van Heurck, Syn. Diat. Belg., pl. XII., fig. 18.

Navicula gibberula, Kutz, Bacill., p. 101, t. III., fig. 50*; Sm., Syn., Vol. i., p. 51, pl. XVII., fig. 160; Ralfs in Prit. Infus., p. 895; Schumann, Diat. der Hohen Tatra, p. 76; Brun, Diat. Alpes and Jura, p. 73, pl. VII., fig. 11; O'Meara, Rep. on the Irish Diat., p. 368; Van Heurck, Syn. Diat. Belg., pl. XII., fig. 19.

Navicula leptogongyla, Kutz., Bacill., p. 99, t. IV., fig. 9; Rabenh., Sussw. Diat., p. 41, t. V., fig. 8; Ralfs in Prit. Infus., p. 895.

Valve with triundulating margin terminating in cuneate extremities and forming three inflations, of which the central is the largest; longitudinal free space narrow and slightly expanded at the middle; striæ fine and transverse.

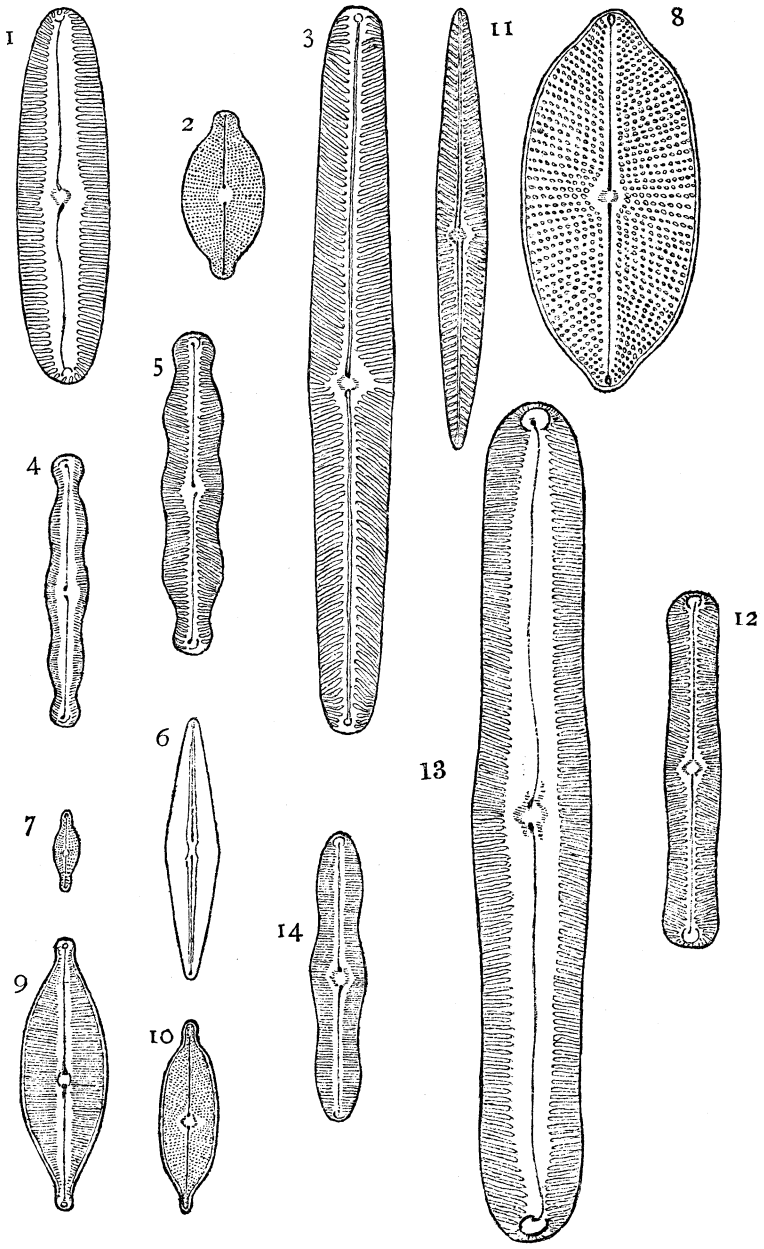
Hab.—Fresh water, frequent. (Plate LXIX., fig. 14.)

Kützing seems to have relied on size and outline in separating *N. gibberula* as a species distinct from *N. limosa*.—*Donkin.*

Note on the Flowers of Populus heterophylla, L.

It appears that the flowers of this poplar have never been fully and accurately described. Dr. Torrey, in the Flora of New York, remarks that he had not seen the staminate catkins, and there are none in his herbarium. Having recently had occasion to collect a large number of both kinds of catkins at the time when they were just mature (May 8), I made a careful examination of them, and here place my observations on record.

The staminate are from 5 cm. to 7 cm. long, oblong, 15 mm. thick; they are extremely fragile, merely shaking the tree causing them to fall to the ground in great numbers, while a hard rain was noticed to have the same effect. They do not fall away from the branch entire under such circumstances, but break off at a short distance from the base; they are borne singly on wood of the previous year a few inches from the terminal buds of the present, but rarely more than two on each twig. They are composed of numerous flowers, very densely aggregated when young, but becoming looser in the elongation of the axis. Their flowers consist of an oblique disc with spreading border, somewhat concave in the middle, which supports numerous stamens (in one 44 were counted); the anthers are oblong and obtuse, 3 mm. long by 1 mm. broad, flat on the dorsal side and provided



Staten Island Diatoms.